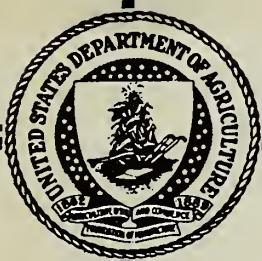
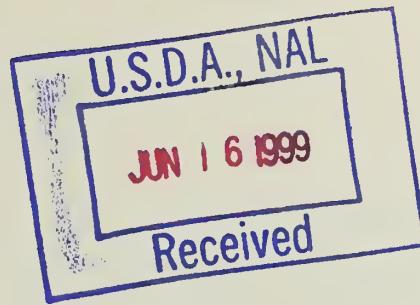


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## UNITED STATES STANDARDS

for grades of

# PASTEURIZED ORANGE JUICE

**First Issue**  
**As Amended**

**EFFECTIVE JULY 1, 1969**

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
FRUIT AND VEGETABLE DIVISION  
PROCESSED PRODUCTS STANDARDIZATION AND INSPECTION BRANCH

These standards supersede the standards which have been in effect since  
September 21, 1968

This is the first issue of the United States Standards for Grades of Pasteurized Orange Juice as amended.

These were published in the Federal Register on July 18, 1967 (32 F.R. 10499) and became effective on August 31, 1967.

The standards amended in 1968 (33 F.R. 11881, August 22, 1968) raise the oil limits (Section 52.5648) and change the method for the determination of recoverable oil (Section 52.5650).

Sections 52.5649, 52.5650, and 52.5652 (34 F.R. 7860) were amended May 17, 1969 to change the basis for expressing acid content from grams per 100 milliliters to grams per 100 grams of juice; and make compensating changes in acid and Brix-acid ratio limit values.

An unofficial reprint of the Food and Drug standards of identity, quality, and fill of container is included.

These standards are included in the Code of Federal Regulations, Title 7 -- Agriculture, Part 52.

This grade standard is issued under authority of the Agricultural Marketing Act of 1946 which provides for the issuance of official U.S. grades to designate different levels of quality for the voluntary use of producers, buyers, and consumers. Official grading service is also provided under this Act upon request of the applicant and upon payment of a fee to cover the cost of the service.

As is the case of other standards for processed fruits and vegetables, these standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by Federal inspection service, which is available for the inspection of other processed products as well.

These standards are issued by the Department after careful consideration of all data and views submitted and the Department welcomes suggestions which might aid in improving these standards in future revisions. Comments may be submitted to, and copies of these standards obtained from:

Chief, Processed Products Standardization and Inspection Branch  
Fruit and Vegetable Division, C&MS  
U.S. Department of Agriculture  
Washington, D. C. 20250

# UNITED STATES STANDARDS FOR GRADES OF PASTEURIZED ORANGE JUICE

Effective July 1, 1969

## PRODUCT DESCRIPTION, STYLES, AND GRADES

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### EXPLANATIONS AND METHODS OF ANALYSIS

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### LOT COMPLIANCE

- 52.5651 Ascertaining the grade of a lot.

### SCORE SHEET

- 52.5652 Score sheet for pasteurized orange juice.

AUTHORITY: The provisions of this subpart issued under secs. 202-208, 60 Stat. 1087, as amended; 7 U.S.C. 1621-1627.

## PRODUCT DESCRIPTION, STYLES, AND GRADES

### § 52.5641 Product description.

Pasteurized orange juice is the product defined in the standards of identity (21 CFR 27.107) issued pursuant to the Federal Food, Drug, and Cosmetic Act.

### § 52.5642 Styles.

- (a) Without sweetener;
- (b) With sweetener.

### § 52.5643 Grades.

(a) "U.S. Grade A" (or U.S. Fancy) is the quality of pasteurized orange juice

#### NOTE:

Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act or with applicable State laws and regulations.

that: (1) Shows no coagulation or no material separation and has the appearance of fresh orange juice, (2) has a very good color, (3) is practically free from defects, (4) possesses a very good flavor, and (5) scores not less than 90 points when scored in accordance with the scoring system outlined in this subpart.

(b) "U.S. Grade B" (or U.S. Choice) is the quality of pasteurized orange juice that: (1) Shows no coagulation but may show some separation and has the appearance of fresh orange juice, (2) has a good color, (3) is reasonably free from defects, (4) possesses a good flavor, and (5) scores not less than 80 points when scored in accordance with the scoring system outlined in this subpart.

(c) "Substandard" is the quality of pasteurized orange juice that fails to meet the requirements of U.S. Grade B.

### FILL OF CONTAINER

### § 52.5644 Recommended fill of container.

The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purpose of these grades. It is recommended that the container be as full of orange juice as practicable.

### FACTORS OF QUALITY

### § 52.5645 Ascertaining the grade of a sample unit.

(a) *General.* The grade of a sample unit of pasteurized orange juice is ascertained by considering the degree of any coagulation and separation, and the appearance of the product as compared to fresh juice which are not scored; the ratings for the factors of color, defects, and flavor which are scored; the total score; and the limiting rules which may be applicable.

(b) *Factors rated by score points.* The relative importance of each scoring

factor is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

Factor	Points
Color -----	40
Defects -----	20
Flavor -----	40
Total score-----	150

#### § 52.5646 Ascertaining the rating for the factors which are scored.

The essential variations within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor which is scored is inclusive (for example, "18 to 20 points" means 18, 19, or 20 points).

#### § 52.5647 Color.

(a) *Evaluation of color.* (1) The color of pasteurized orange juice, where applicable, is evaluated by comparing the color of the product with the USDA Orange Juice Color Standards so that these color standards become points of reference.

(2) Such comparison is made under an artificial light source of approximately 150 candle intensity and having a spectral quality approximating that of daylight under a moderately overcast sky and a color temperature of 7,500 degrees Kelvin,  $\pm 200$  degrees.

(3) The USDA Orange Juice Color Standards range from yellow-orange to yellow color, with USDA OJ 1 being the most orange color in the series.

(b) *Procedure in evaluating color.* (1) Place the juice in a clear glass test tube of 1-inch diameter.

(2) Arrange color standards in a test tube rack or similar device so that light coming from above strikes the standards at a 45 degree angle. The standards are inclined at a 45 degree angle against a neutral grey background. Observe the standards and product at right angles to the tubes.

(3) Classify the juice by inserting the tube of juice where it best fits in the series of color standards. Orange juice differing in color and brightness from the most nearly matching USDA Orange

Juice Color Standard is evaluated by considering the amount of difference and its effect on the total appearance of the juice.

(c) *Availability of color standards.* The USDA Orange Juice Color Standards cited in this section are official color standards which may also be applied to other orange juices. Information regarding these color standards, and their availability, may be obtained from:

Processed Products Standardization and Inspection Branch, Fruit and Vegetable Division, Consumer and Marketing Service, U.S. Department of Agriculture, Washington, D.C. 20250.

(d) (A) *Classification.* Pasteurized orange juice that has a very good color may be given a score of 36 to 40 points. "Very good color" means a very good yellow to yellow-orange color that is bright and typical of fresh orange juice. Pasteurized orange juice that meets this criterion may be assigned score points in accordance with the following schedule:

As compared with USDA Orange Juice Color Standards:	Score (points)
Equal to or better than USDA OJ 2-----	40
Equal to or better than USDA OJ 3-----	39
Much better than USDA OJ 4-----	38
Equal to or slightly better than USDA OJ 4-----	37
Equal to or better than USDA OJ 5-----	36

(e) (B) *Classification.* If the juice has a good color, a score of 32 to 35 points may be given. Pasteurized orange juice that falls into this classification shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule). "Good color" means that the color is the yellow to yellow-orange color typical of fresh orange juice which may be dull but is not off color for any reason. Pasteurized orange juice that meets this criterion may be assigned score points in accordance with the following schedule:

As compared with USDA Orange Juice Color Standards:	Score (points)
Better than USDA OJ 6 but not as good as USDA OJ 5-----	35
Equal to USDA OJ 6-----	34
Not as good as USDA OJ 6-----	33 or 32

(f) (SStd.) *Classification.* If the pasteurized juice fails to meet the requirements of paragraph (e) of this sec-

tion a score of 0 to 31 points may be given. Pasteurized orange juice that falls into this classification shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### § 52.5648 Defects.

(a) *General.* The factor of defects concerns the degree of freedom from small seeds and portions thereof; from discolored specks, harmless extraneous material, and other similar defects; from recoverable oil; and from juice sacs and particles of membrane, core, and peel in excess of that normally present in orange juice.

(b) *Definitions.* (1) "Small seeds and portions thereof" means seed, whether fully developed or not, and particles of seed that could pass readily through round perforations one-eighth inch (3.2 mm.) in diameter.

(2) "Recoverable oil" means oil recoverable by the method outlined in this subpart.

(c) (A) *Classification.* Pasteurized orange juice that is practically free from defects may be given a score of 18 to 20 points. "Practically free from defects" means that any combination of defects present may no more than slightly detract from the appearance or drinking quality of the juice, and that there may be present not more than 0.035 percent by volume of recoverable oil.

(d) (B) *Classification.* If the pasteurized juice is reasonably free from defects, a score of 16 or 17 points may be given. Pasteurized orange juice that falls into this classification shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule). "Reasonably free from defects" means that any combination of defects present may not seriously detract from the appearance or drinking quality of the juice, and that there may be present not more than 0.045 percent by volume of recoverable oil.

(e) (SSStd.) *Classification.* Pasteurized orange juice that fails to meet the requirements of paragraph (d) of this section may be given a score of 0 to 15 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### § 52.5649 Flavor.

(a) (A) *Classification.* Pasteurized orange juice that possesses a very good flavor may be given a score of 36 to 40 points. "Very good flavor" means that the flavor is fine, distinct, and substantially typical of orange juice extracted from fresh, mature sweet oranges; is free from off flavors of any kind; and meets the following requirements:

##### (1) Without sweetener style.

	Minimum	Maximum
Brix (degrees).....	11°.....	
Brix-acid ratio: From fruit grown pre- dominantly in California or Arizona.	11.5:1.....	18:1.
From fruit grown pre- dominantly outside Cali- fornia or Arizona.	12.5:1.....	20.5:1.

##### (2) With sweetener style.

	Minimum	Maximum
Soluble orange juice solids (percent by weight of finished product).	11%.....	
Brix-acid ratio.....	12.5:1.....	20.5:1.

(b) (B) *Classification.* If the pasteurized orange juice possesses a good flavor a score of 32 to 35 points may be given. Pasteurized orange juice that falls into this classification shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule). "Good flavor" means that the flavor is fairly typical of orange juice extracted from fresh, mature sweet oranges; is free from off flavors of any kind; and meets the following requirements:

##### (1) Without sweetener style.

	Minlmum	Maximum
Brix (degrees).....	10.5°.....	
Brix-acid ratio.....	10.5:1.....	23:1.

##### (2) With sweetener style.

	Minimum	Maximum
Soluble orange solids (percent by weight of finished product).	10.5%.....	
Brix-acid ratio.....	10.5:1.....	23:1.

(c) (SStd.) *Classification.* Pasteurized orange juice that fails to meet the requirements of paragraph (b) of this section may be given a score of 0 to 31 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

#### EXPLANATIONS AND METHODS OF ANALYSIS

##### § 52.5650 Definitions of terms and methods of analysis.

(a) *Brix.* "Brix" means the degrees Brix of pasteurized orange juice when tested with a Brix hydrometer calibrated at 20 degrees C. (68 degrees F.) and to which any applicable temperature correction has been made. The degrees Brix of pasteurized orange juice may be determined by any other method which gives equivalent results.

(b) *Acid.* "Acid" means the grams of total acidity, calculated as anhydrous citric acid, per 100 grams of pasteurized orange juice. Total acidity is determined by titration with standard sodium hydroxide solution using phenolphthalein as indicator.

(c) *Brix-acid ratio.* "Brix-acid ratio" means the ratio between the Brix and the acid as defined in this section.

(d) *Recoverable oil.* "Recoverable oil" is determined by the following methods:

##### METHOD

###### (1) Reagents.

*Standard bromide-bromate solution*—prepared and standardized to 0.099N in accordance with Chapter 42, Standard Solutions in the current edition of the AOAC.<sup>1</sup> For use, add 1 volume of standard solution to 3 volumes of water to make 0.0247N solution. 1 ml. of 0.0247N solution supplies bromine to react with 0.00085g., or 0.0010 ml., of *d*-limonene. The solutions are stable for six months.

*2-Propanol*—Reagent grade ACS (American Chemical Society).

*Dilute hydrochloric acid*—prepared by adding 1 volume of concentrated acid to 2 volumes of water.

*Methyl orange indicator*—0.1 percent in water.

###### (2) Apparatus.

*Electric heater*—with recessed refractory top, 500–750 watts.

*Still, all glass*—500 ml. distillation flask with 24/40 standard taper neck; 200 mm. Graham condenser with 28/15 receiving socket and drip tip; connecting bulb and adapter as shown in Figure 1.

*Burette*—10 ml. or 25 ml. graduated to 0.1 ml., with easily controllable flow to permit both rapid and dropwise titration.

###### (3) Determination.

(i) Pipette 25 ml. of well-mixed sample (juice or reconstituted juice) into the distillation flask containing carborundum chips or glass beads, and add 25 ml. of 2-Propanol.

(ii) Distill into a 150 ml. beaker. Continue distilling until solvent ceases to reflux then remove the flask from the heater.

(iii) Add 10 ml. of dilute hydrochloric acid and 1 drop of indicator. (An alternative method would be to prepare a solution containing 5 ml. of indicator and 1,000 ml. of dilute hydrochloric acid—then add 10 ml. of this acid-indicator mix to the 150 ml. beaker.)

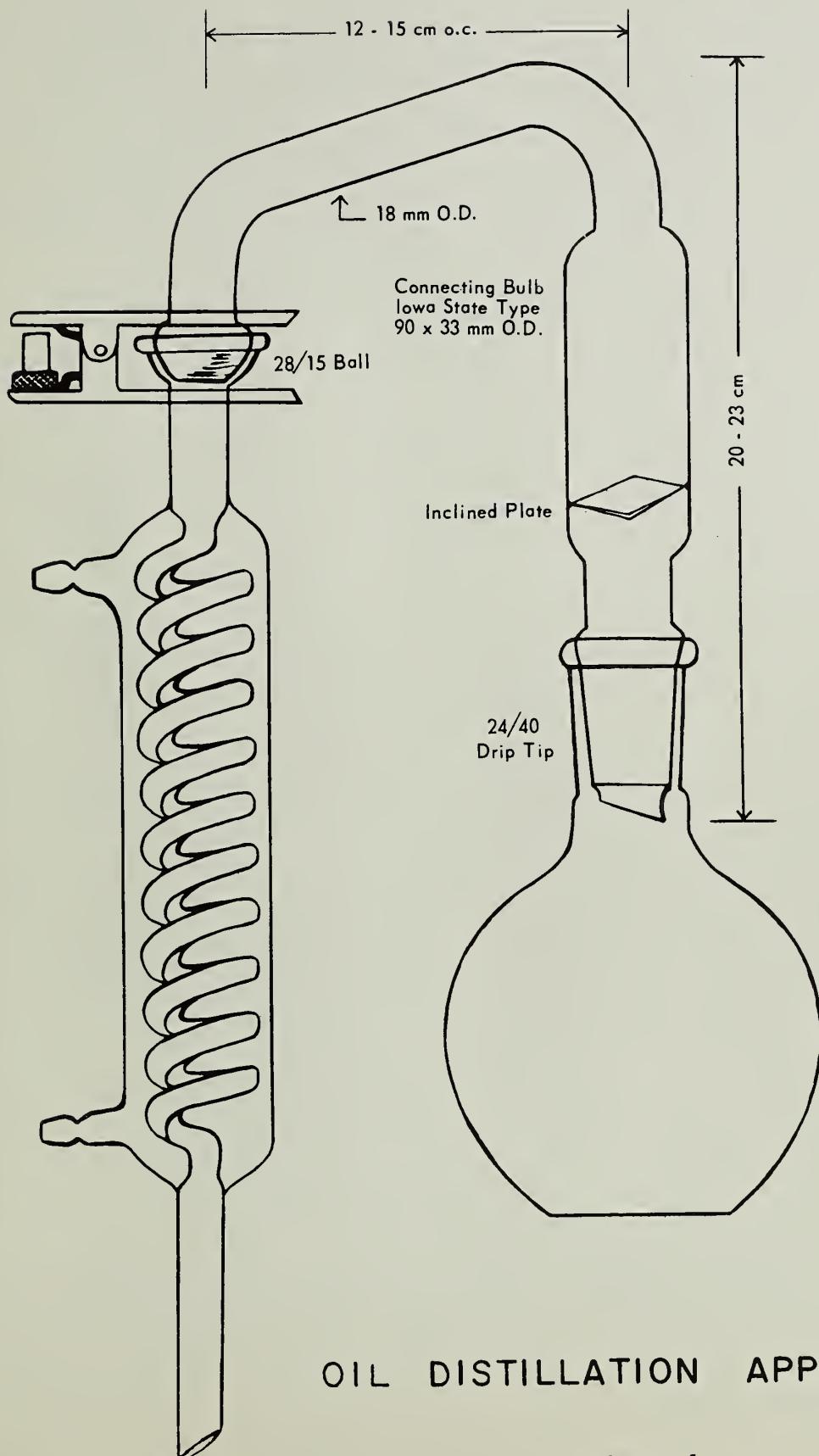
(iv) Titrate with the dilute bromate solution while stirring. The major portion of the titrate may be added rapidly, but the endpoint must be approached at about 1 drop per second. Disappearance of color indicates the endpoint.

(v) Determine the reagent blank by titrating three separate mixtures of 25 ml. 2-Propanol and 10 ml. of dilute hydrochloric acid with indicator—without refilling the burette. Divide the total ml. of titrant used by three to obtain the average blank. Subtract the average blank thus obtained from the ml. of titrant used to titrate the distillate.

(vi) Multiply the remainder by 0.004 to obtain the percent recoverable oil by volume in the juice sample.

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<sup>1</sup> "AOAC" refers to the Official Methods of Analysis published by the Association of Official Analytical (formerly Agricultural) Chemists. Copies may be obtained from this Association at Box 540, Benjamin Franklin Station, Washington, D.C. 20044.



OIL DISTILLATION APPARATUS

Figure 1



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**LOT COMPLIANCE****§ 52.5651 Ascertaining the grade of a lot.**

The grade of a lot of pasteurized orange juice covered by these standards is determined by the procedures set forth in the regulations governing inspection and certification of processed fruits and vegetables, processed products thereof, and certain other processed food products (§§ 52.1 to 52.87).

**SCORE SHEET****§ 52.5652 Score sheet for pasteurized orange juice.**

Size and kind of container.....	.....
Container mark (packages)..... or	.....
Identification (cases).....	.....
Label (including ingredient statement, if any).....	.....
Liquid measure (fluid ounces).....	.....
Style.....	.....
Brix (degrees).....	.....
Acid (grams/100 gm.: calculated as anhydrous citric acid).....	.....
Brix-acid ratio ( ).....	.....
Recoverable oil (% by volume).....	.....
Degree of coagulation.....	<input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Serious

Factors	Score points
Color.....	40
	(A) 36-40 (B) <sup>1</sup> 32-35 (SStd.) <sup>1</sup> 0-31
Defects.....	20
	(A) 18-20 (B) <sup>1</sup> 16-17 (SStd.) <sup>1</sup> 0-15
Flavor.....	40
	(A) 36-40 (B) <sup>1</sup> 32-35 (SStd.) <sup>1</sup> 0-31
Total score.....	100

Grade.....
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<sup>1</sup> Indicates limiting rule.

**Effective date.** The amendments to each affected grade standard shall become effective on July 1, 1969.

(Secs. 202-208, 60 Stat. 1087, as amended; 7 U.S.C. 1621-1627)

Dated: May 12, 1969.

**JOHN E. TROMER,**  
*Acting Deputy Administrator,*  
*Marketing Services.*

*Published in the Federal Register of July 18, 1967 (32 F.R. 10499)*

*Sections 52.5648 and 52.5650 amended August 22, 1968 (33 F.R. 11881)*

*Sections 52.5649, 52.5650, and 52.5652 amended May 17, 1969 (34 F.R. 7860)*